

REMARKS

Claims 1-3 are currently pending. By this response, claim 1 is amended. Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

IDS Materials

A letter is filed concurrently herewith which includes copies of the foreign and/or non-patent literature documents that were cited in the International Search Report and listed on the Form PTO-SB08 filed with the Information Disclosure Statement on February 2, 2006.

Allowable Subject Matter

Applicants note the Examiner's indication that Claim 2 would be allowable if rewritten in independent form.

Claim Rejections Under 35 U.S.C. § 103

Claims 1 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto (U.S. Patent No. 6,185,955; hereinafter "Yamamoto") in view of Kishita, et al. (U.S. Patent No. 5,884,497; hereinafter "Kishita"). This rejection is respectfully traversed.

Independent claim 1 is directed to a refrigeration system. The refrigeration system comprises:

a refrigerant circuit (10) in which a compressor (21), a heat source side heat exchanger (24), an expansion mechanism (32) and a heat use side heat exchanger (33) are connected via refrigerant pipes to operate on a vapor compression refrigeration cycle; and an oil recovery container (40) connected to the suction side of the compressor (21), the refrigeration system carrying out a recovery operation for circulating refrigerant through the refrigerant circuit (10) via the recovery container (40) and carrying out a normal operation while storing the recovered oil in the recovery container (40) after the recovery operation, wherein the refrigeration system further comprises:

a compressor control section (50) for stepwise increasing the operating capacity of the compressor (21) up to a predetermined capacity in an initial stage of the recovery operation so that an abrupt drop of the refrigerant temperature in the low pressure side of the refrigerant circuit (10) is suppressed; and

a fan control section (70) for continuously driving a heat use side fan (33a) for the heat use side heat exchanger (33) in the recovery operation at least during driving of the compressor (21).

With this particular arrangement, the present invention is directed to an initial stage of a recovery operation for recovering oil remaining in an existing refrigerant pipes before a new refrigeration system is installed. Specifically, the refrigeration system carries out a normal operation of cooling and heating while storing the recovered oil in the recovery container. As such, the stored recovered oil is discarded.

In contrast, Yamamoto describes a refrigerating system including a compressor (1), which contains lubricating oil and compresses the given refrigerant into a supercritical state having pressure higher than the critical pressure of the given refrigerant. The compressor discharges a compressed refrigerant of the supercritical state together with the lubricating oil. The compressed refrigerant is separated from the lubricating oil by an oil separator (2) and thereafter cooled in a radiator (3) into a cooled refrigerant. After being decompressed in an expander (4) and evaporated in an evaporator (5), the cooled refrigerant is supplied as the given refrigerant to the compressor. See Abstract and Figure 1 of Yamamoto.

In other words, Yamamoto is merely concerned with recovering oil discharged from a compressor back to the compressor during a normal operation. Specifically, the refrigerating system of Yamamoto includes an oil separator for separating oil from refrigerant discharged from a compressor to redirect the oil back into the compressor. This is fundamentally different from the claimed invention which provides a recovery operation for circulating refrigerant through a refrigerant circuit via a recovery container and a normal operation while storing the recovered oil in the recovery container after the recovery operation. Unlike the present invention, Yamamoto is not concerned with recovering the oil attached to refrigerant pipes and storing the recovered oil. Thus, Yamamoto is completely silent with respect to carrying out a normal refrigeration operation while storing a recovered oil in the recovery container after a recovery operation as claimed.

In addition, Yamamoto does not disclose a compressor control section (50) for stepwise increasing the operating capacity of the compressor (21) up to a predetermined capacity in an

initial stage of the recovery operation so that an abrupt drop of the refrigerant temperature in the low pressure side of the refrigerant circuit (10) is suppressed and a fan control section (70) for continuously driving a heat use side fan (33a) for the heat use side heat exchanger (33) in the recovery operation at least during driving of the compressor (21).

The Examiner contends that Kishita makes up for the deficiencies of Yamamoto. Applicants respectfully disagree.

Kishita describes an automotive air conditioner capable of suppressing periodic torque variation in an engine-driven refrigerant compressor while ensuring performance of returning oil thereto to circumvent periodic variation in a rotational speed of an engine. Kishita further describes, in the background section, an automotive air conditioner including a switchover operation, which is performed to increase the discharge capacity of a compressor to enhance returning oil to the refrigerant compressor when a cooling load is reduced. See Abstract and lines 20-34, col. 1 of Kishita.

Therefore, the automotive air conditioner in Kishita is directed to keep recovering oil discharged from a compressor while suppressing a reduction of the operating capacity of the compressor (the rpm number of the engine) as much as possible during a normal operation. This is wholly unlike the claimed invention which provides gradually increasing the operation capacity of a compressor so as not to abruptly drop a suction refrigerant temperature. In fact, Kishita teaches away from the claimed invention by operating the compressor at the highest capacity possible from the initial stage of the oil recovery operation and maintaining the fluid velocity in the refrigerant circuit as fast as possible to enhance the ability to recover oil. Thus, contrary to the assertion by the Examiner, Kishita fails to make up for the deficiencies of Yamamoto.

Moreover, the Examiner admits that Kishita does not disclose a compressor control section for stepwise increasing the operating capacity of the compressor. The Examiner then takes Official Notice that a compressor capacity increases stepwisely is old and well known in the art at the time of the invention. Applicants respectfully traverse the Examiner's taking of Official Notice and respectfully request that a proper prior art be cited that teaches or suggests the particular feature or set of features as claimed.

In addition, the Examiner states that Kishita does not disclose that the heat use fan is in operation. The Examiner then again takes Official Notice that these fans are typically operating during operation of the circuit for the purpose of enhancing heat exchange. Applicants respectfully traverse the Official Notice, and respectfully request that a proper prior art be cited that teaches or suggests the particular feature or set of features as claimed.

As the Examiner has failed to provide a reference that teaches the above-discussed features of claim 1, the Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. § 103(a).

In view of the above remarks, it is respectfully submitted that claim 1 is not unpatentable over Yamamoto and Kishita, when taken alone or in combination (assuming they can be combined, which Applicants do not admit). As claim 3 is dependent to claim 1, it is respectfully submitted that this claim is also patentable for at least its dependency. It is thus further respectfully submitted that this rejection should be withdrawn.

CONCLUSION

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Dennis P. Chen Reg. No. 61,767 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

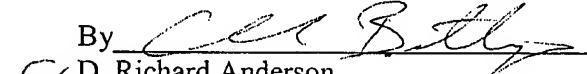
Application No. 10/566,726
Amendment dated May 13, 2009
Reply to Office Action of February 13, 2009

Docket No.: 4633-0159PUS1

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: May 13, 2009

Respectfully submitted,

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